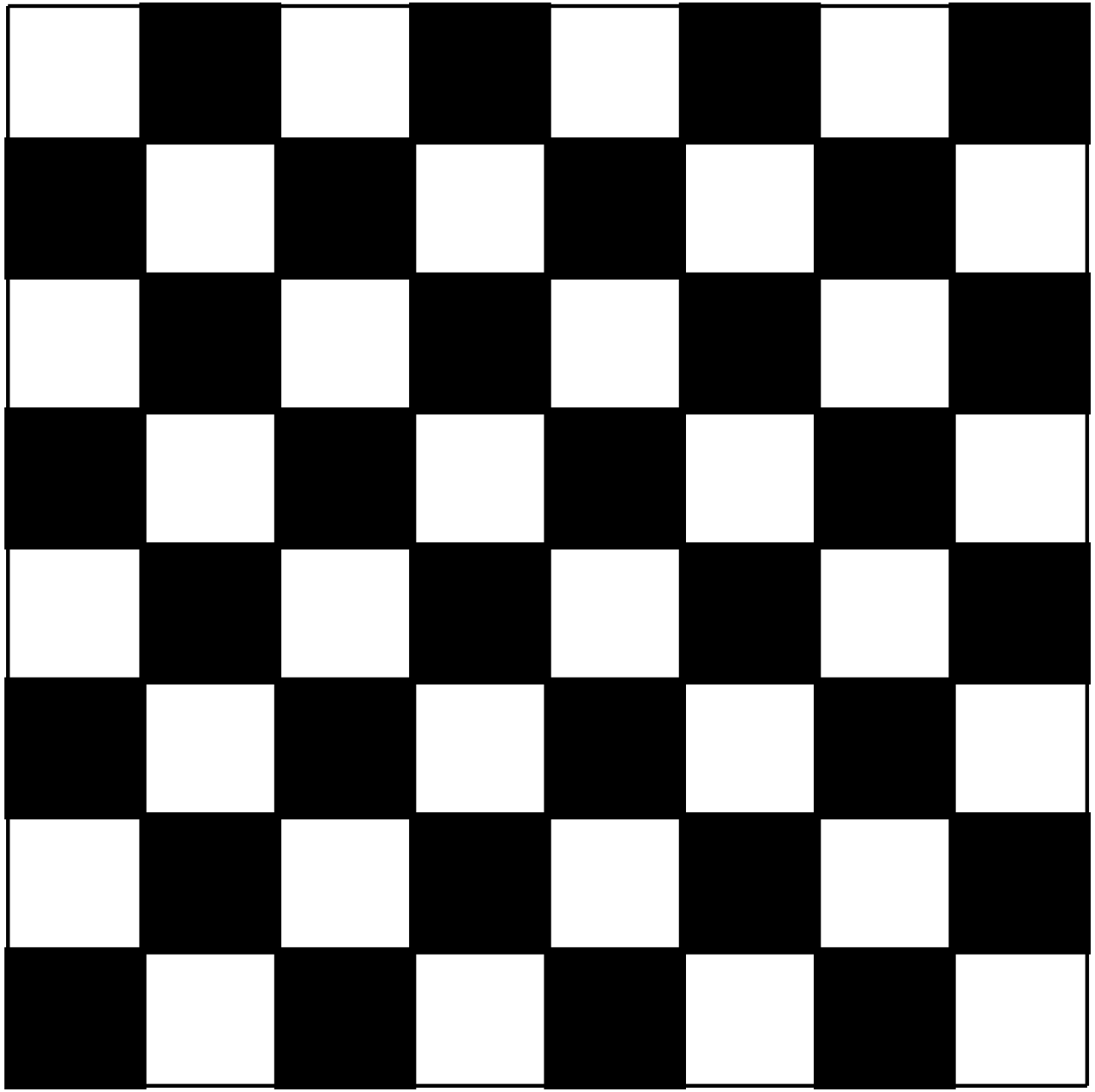
Episode 12
Covering a chessboard with dominoes

European section – Season 2

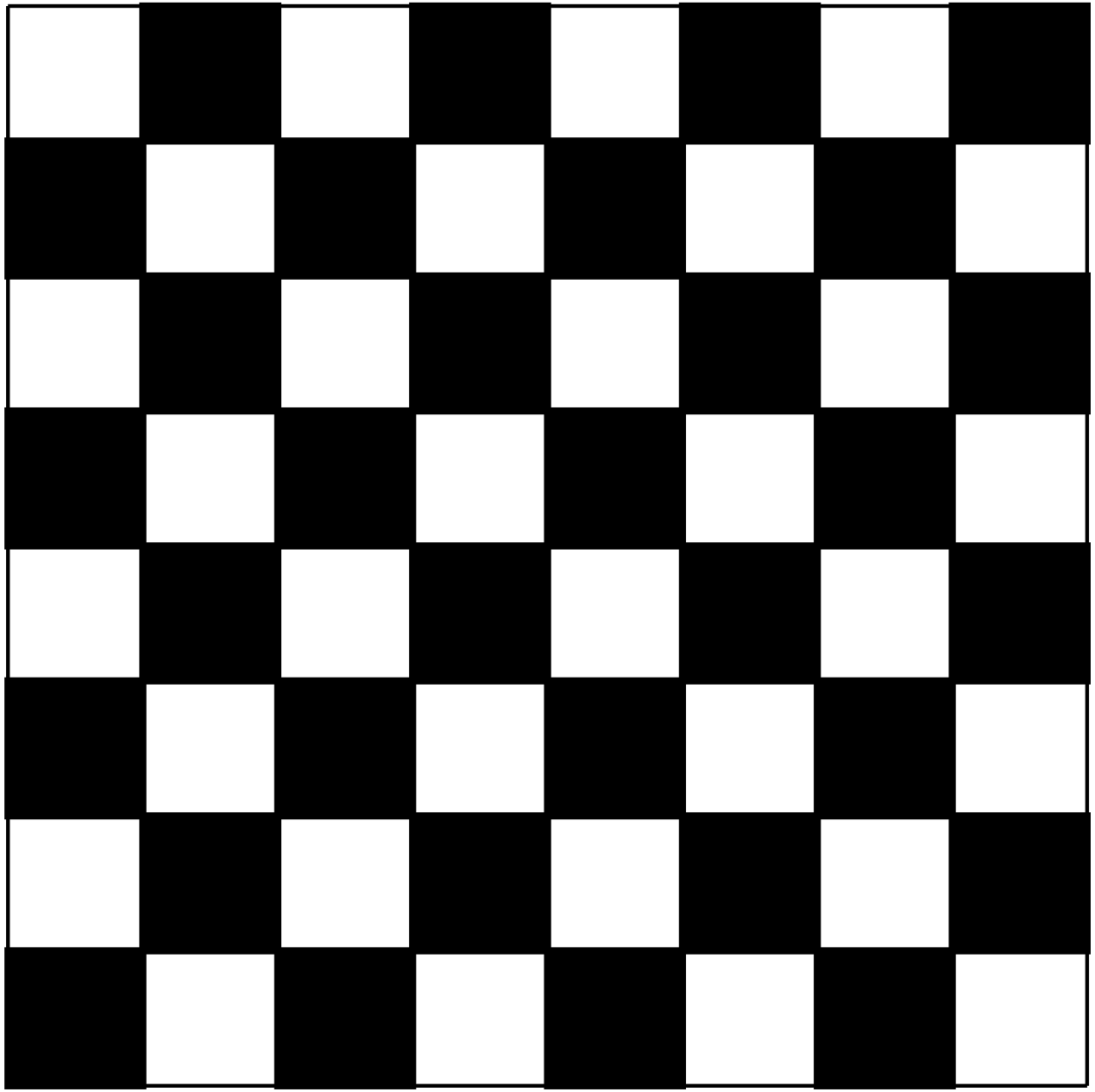
Problem 1

Is it possible to cover a whole chessboard with dominoes ?



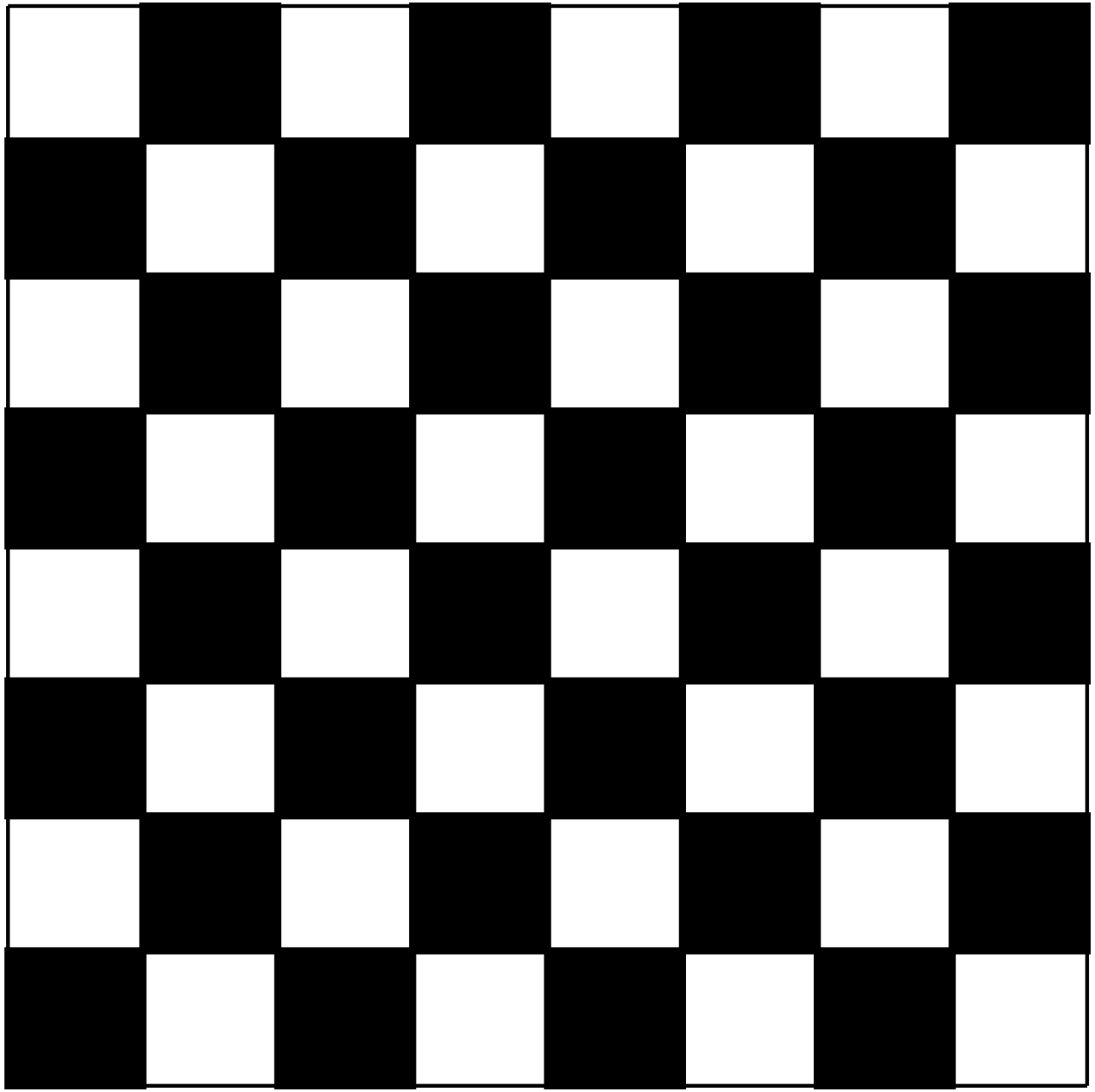
Problem 2

One corner has been removed from a chessboard. Is it possible to cover the remaining portion of the board with dominoes so that each domino covers exactly two squares? What if two opposite corners are removed ?



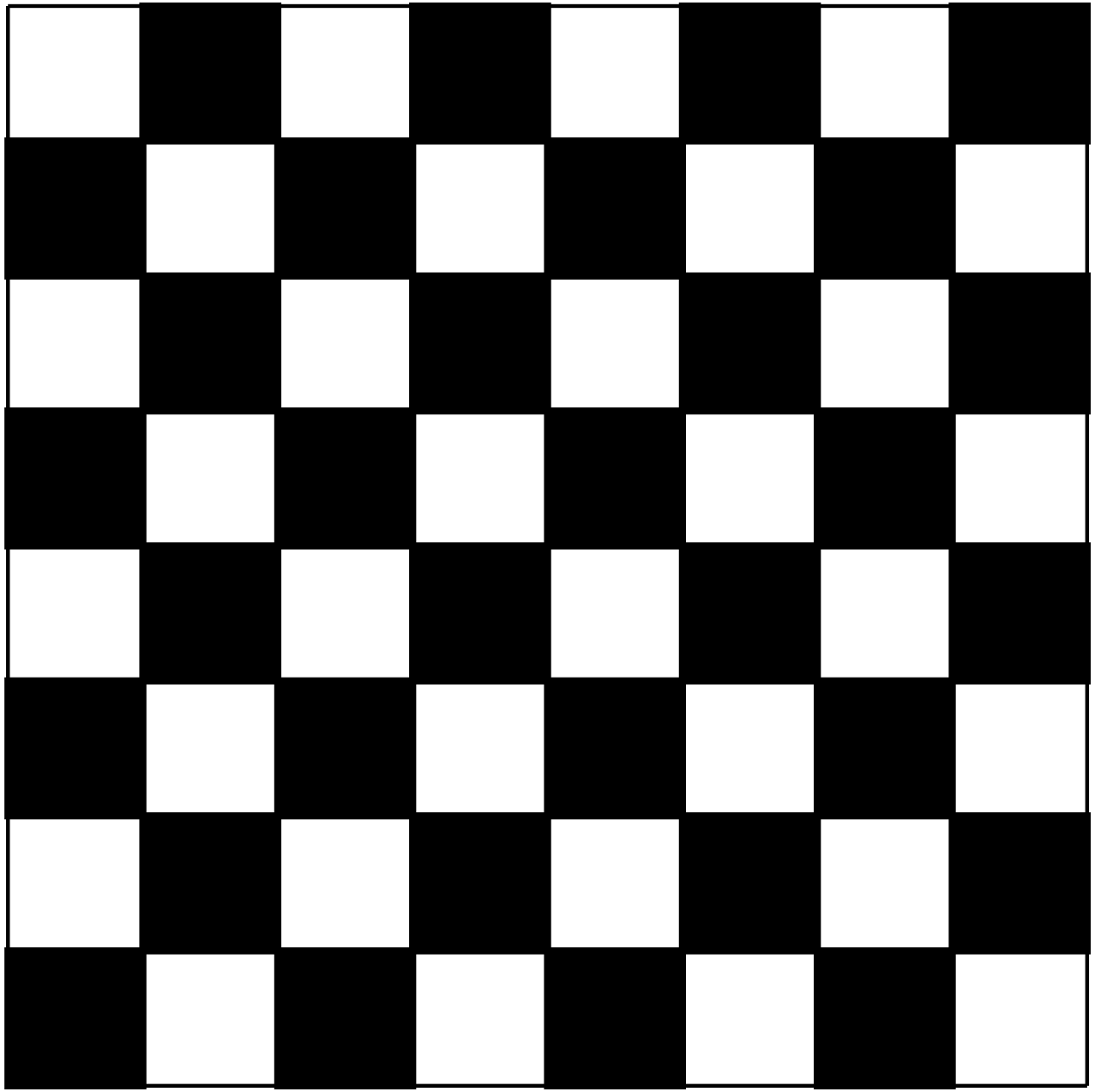
Problem 3

Two arbitrary but adjacent squares have been removed from a chessboard. Is it possible to cover the remaining portion of the board with dominoes so that each domino piece covers exactly two squares?



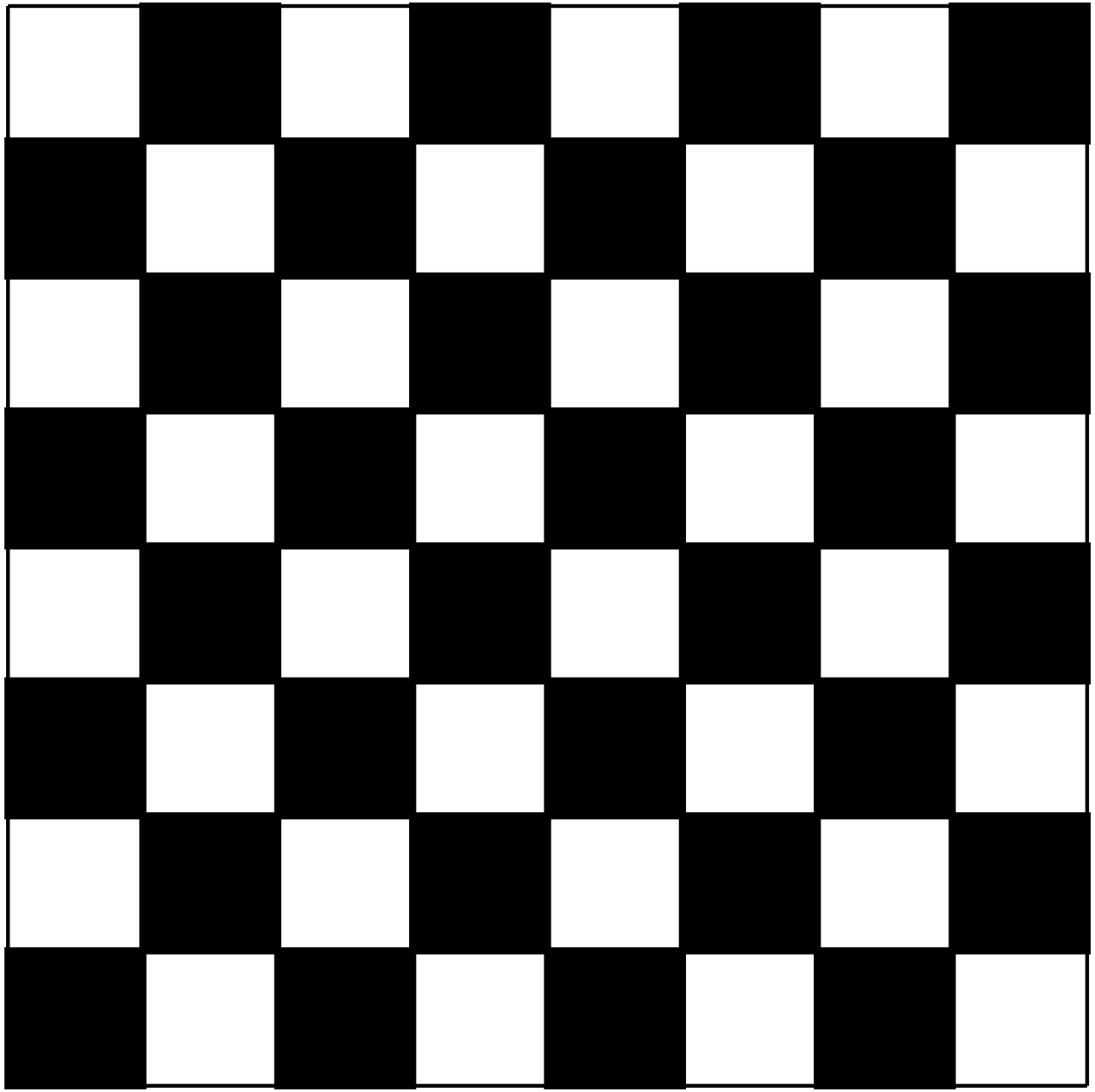
Problem 4

Two arbitrary squares of different colors have been removed from a chessboard. Is it possible to cover the remaining portion of the board with dominoes so that each domino piece covers exactly two squares?



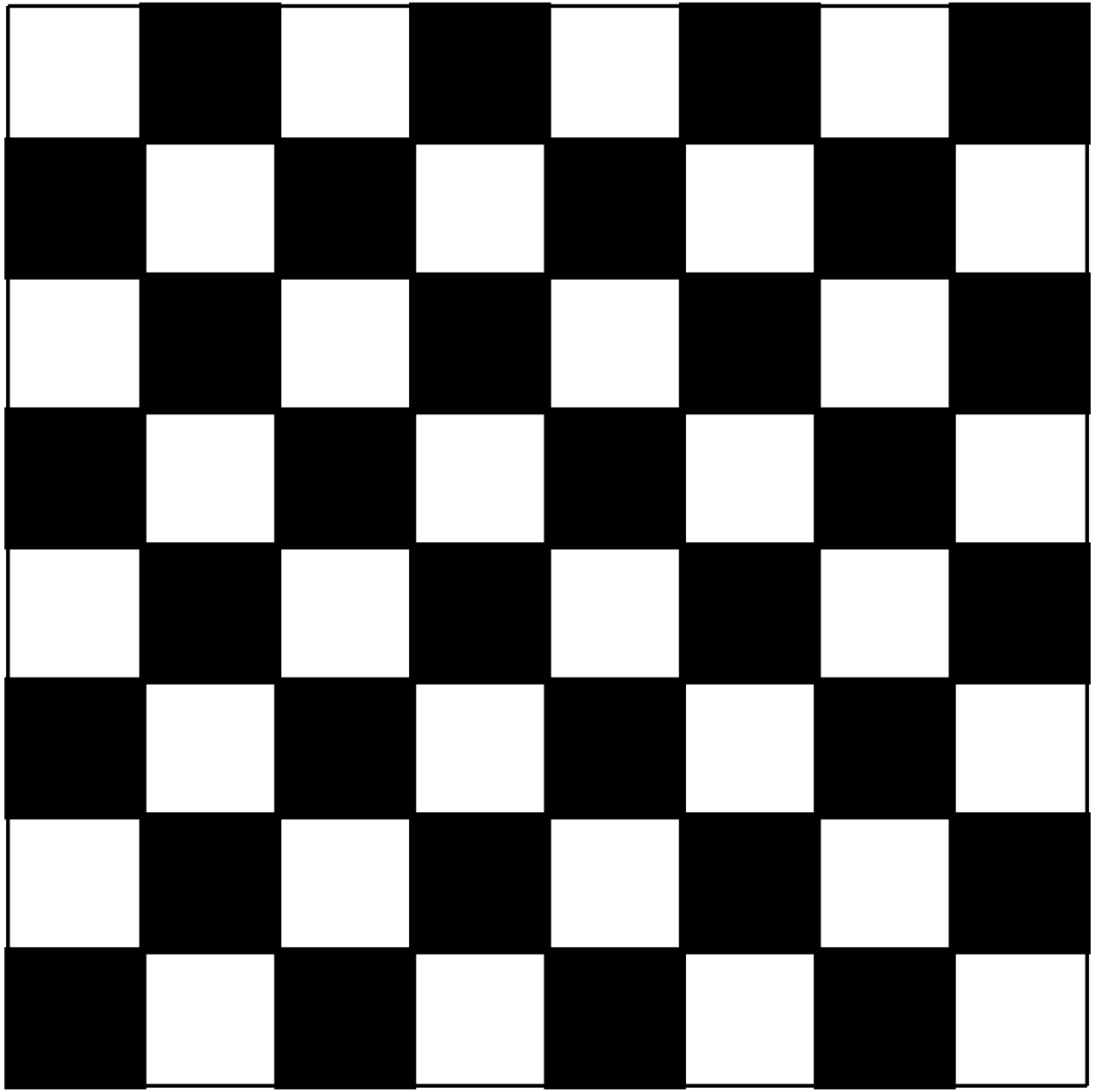
Problem 5

Two arbitrary pairs of squares of different colors have been removed from a chessboard. Is it always possible to cover the remaining portion of the board with dominoes so that each domino piece covers exactly two squares?



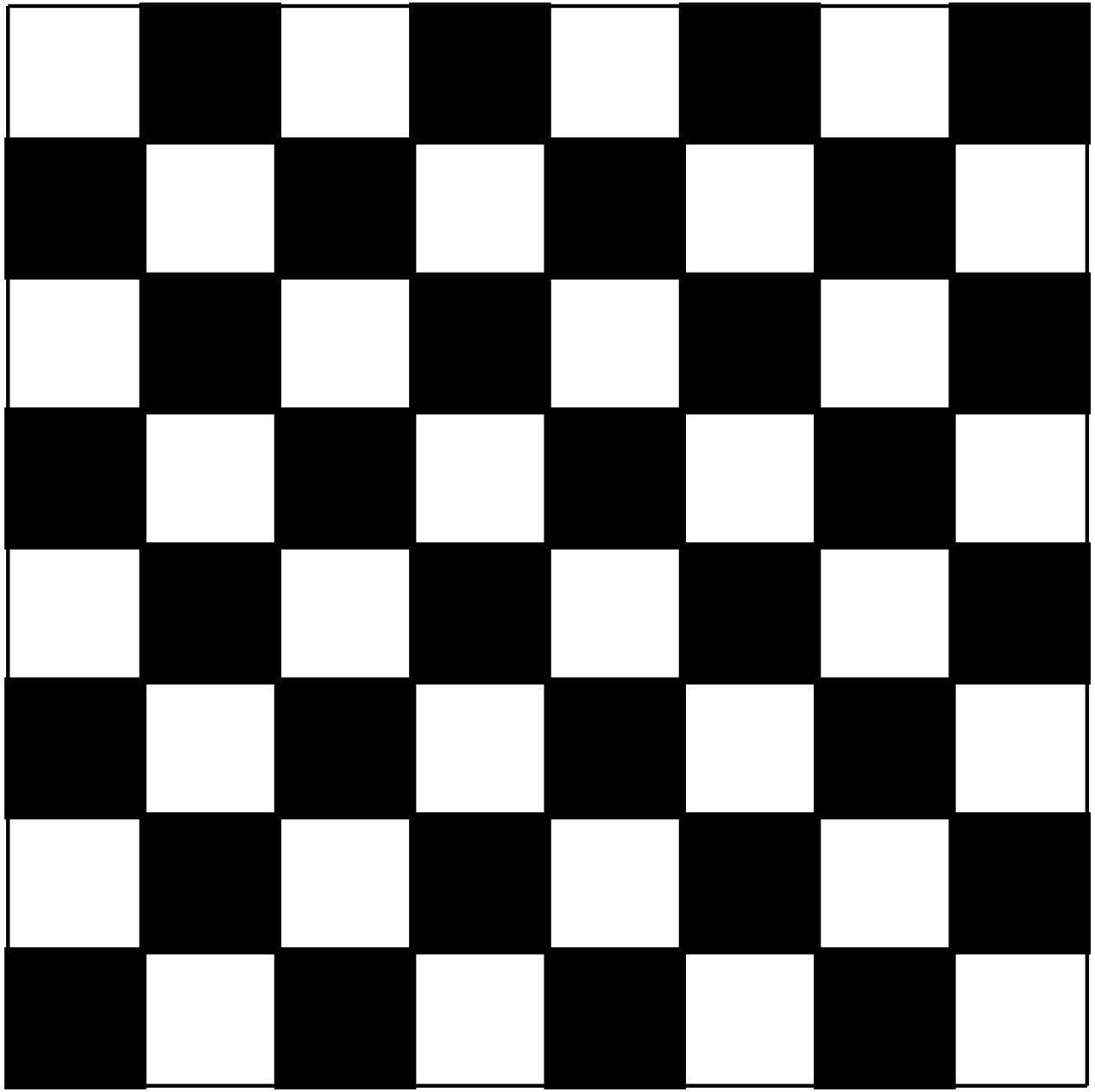
Problem 6

Three arbitrary pairs of squares of different colors have been removed from a chessboard, so that the chessboard does not split into two or more separate pieces. Is it always possible to cover the remaining portion of the board with dominoes so that each domino piece covers exactly two squares?



Problem 7

A domino has two edges, a long edge and a short edge. Two adjacent dominoes must be in one of the only three possible configurations : long edge to long edge, short edge to short edge and long edge to short edge. In a domino tiling of a chessboard, what is the minimum number of long-edge to long-edge pairs ?



Problem 8

Prove that in any cover of a whole chessboard with dominoes, the number of horizontal dominoes with a black left square and the number of horizontal dominoes with a white left square are equal.